Climatological Data for October, 1910.

DISTRICT No. 9, COLORADO VALLEY.

FREDERICK H. BRANDENBURG, District Editor.
PATRICK MCDONOUGH, Acting District Editor.

GENERAL SUMMARY.

The weather conditions during October in the region drained by the Colorado were even finer than usual. In most respects the conditions closely resembled those common to September. High temperatures were persistent, and while killing frosts occurred they were not generally noted until the close of the second decade. Rains fell in districts where, as a general thing in October, the precipitation is in the form of snow.

The month opened with increasing cloudiness, due to a low that developed in Utah; rain followed on the 2d over the greater part of the drainage area, and sharp falls in temperature occurred in the central and northern parts of the district with the movement of the low center to the eastern slope. On the morning of the 3d high pressure with clear skies obtained over all but the extreme southwestern part of the district; and frosts, mostly light, were generally reported. Under the influence of a northern low, the pressure fell rapidly during the night of the 4th, followed quickly by a corresponding rise in pressure, some cloudiness, and but little precipitation. Frosts were noted in localities on the morning of the 4th. Uninterrupted stationary high pressure, with clear skies, then prevailed for nearly a week. From the 10th to the 18th low pressure areas exerted a controlling influence, although a few highs of slight intensity moved from the west across the northern part of the district. During the first few days of this period there were a few local rains, then followed general precipitation in the northern part of the district, lasting until the 20th, except in Arizona, where the rains were scattered. The anticyclone that appeared in the north on the morning of the 18th, moved south, and two days later its crest overlay the extreme northern part of the district. Snow fell generally in the mountain region of central Colorado and northwestern New Mexico, and hard freezing weather occurred, except in the southern parts of Arizona and adjacent region in New Mexico. The high pressure was slow in dissipating, and it was not until the 25th that disintegration set in, only to be followed within 36 hours by another high from the north, which gave a return to clear skies, lasting until the end of the month. During the last decade precipitation occurred at a few stations in Arizona.

TEMPERATURE.

The mean of the 121 stations reporting was 56.0°, or 1.1° above the normal. By subdivisions the means and departures were: Western Wyoming, 40.4°, +1.1°; western Colorado, 44.3°, +0.6°; eastern Utah, 50.4°, +2.3°; western New Mexico, 54.8°, +1.1°; Arizona, 64.9°, +0.9°; and southeastern Nevada, 59.6°. The highest monthly mean was 86.2° at Casa Grande, Ariz., and the lowest, 30.0°, at Corona, Colo.

Temperatures averaged slightly below the normal at the beginning of the month. In Arizona from the 4th to the 11th they were much above the normal, and the same is true of the central and northern parts of the district from the 7th to the 14th, inclusive. In southern Arizona, which was first to experience the change to cooler, temperatures were considerably below the normal from the 12th to the 21st, while in the central and northern parts of the district the cool period was shorter, extending from the 17th to the 22d, inclusive. The deficiency, however, was marked on the 19th, 20th, and 21st. During the last eight or nine days temperatures were again above the normal, especially in Arizona. By subdivisions the temperature extremes were: Western Wyoming, 84° and 4°; western Colorado, 90° and −5°; eastern Utah, 96° and 16°; western New Mexico, 98° and 5°; Arizona, 110° and 16°; southeastern Nevada, 101° and 27°. In the southern and central parts of the district the maximum temperatures recorded on the 8th or 9th are the highest of record for October.

PRECIPITATION.

The average precipitation for the 169 stations reporting was 1.00 inch, or 0.05 inch below the normal. By watersheds the means and departures were: Green, 1.38, +0.24; Grand, 1.78, +0.41; San Juan, 3.02, +1.01; Little Colorado, 0.56, −0.41; Gila, 0.22, −0.37; Mimbers, 0.31, −0.57; and Colorado, proper, 0.90, +0.44 inch. There were two periods of precipitation; the first beginning in Utah and Arizona on the 1st of the month, and ending in Colorado and Wyoming on the 4th. The other period extended from the 12th to the 20th and was of more importance, as precipitation was general in Colorado and Utah and fairly well distributed in the remainder of the district. On the 16th and 17th heavy snow fell in the mountains of Colorado the following being among the heavier 24-hour falls, expressed in water equivalents: Bedrock, 1.05; Cascade, 2.39; Craig, 1.10; Gladstone, 1.16; Ironton, 1.31; Lake City, 1.10; Montrose, 1.30; Pagosa Springs, 1.08; Silverton, 1.23; and Silverton (near), 2.50 inches. The greatest monthly amount was 6.77 inches at Cascade, Colo., while none occurred at four stations in New Mexico and four stations in Arizona. The greatest monthly snowfall was 68 inches at Corona, Colo. The average number of days with 0.01 inch or more of precipitation was 4.

MISCELLANEOUS.

The percentage of sunshine was below the normal in southwestern Colorado and central Arizona; elsewhere there was generally an excess. Grand Junction reported 76, Durango, 70; Flagstaff, 87; Phoenix, 84; and Yuma, 96 per cent of the possible.

The mean relative humidity reported was as follows: Grand Junction, 49; Durango, 58; Flagstaff, 50; Phoenix, 39; and Yuma, 44 per cent.

DUTY OF WATER.

By A. L. FELLOWS, Consulting Engineer.

Volumes already have been, and much more might be written regarding the "duty of water" in the arid regions. The subject has been discussed in the reports of The Division of Irrigation Inquiry, United States Department of Agriculture, in numerous agricultural college bulletins, and in many works on irrigation. A few of the underlying principles regarding the duty of water are:

1. By the term "duty of water," we mean that amount of water necessary to irrigate a given amount of land to the best possible advantage; thus, for example, under certain conditions, the duty of water upon a given tract of land may be 1 acre-foot per acre, under other conditions on another tract, it may be 2 acre-feet per acre, provided only that the best results under the existing conditions are obtained. In general, however, the term is somewhat loosely used and is often understood to mean the amount of water actually applied to land, whether such application is beneficial or not. Thus, it is stated in some of our irrigation works that the duty of water upon certain described tracts is as much as 15 acre-feet per acre and even more, though there is no possibility whatsoever that any such amount of water was actually used to good advantage upon such land.

2. The meaning of the term varies under an infinite number of conditions. Thus, when we are referring to water being taken from a natural running stream, we must take into consideration loss in transit by evaporation; where storage is practised, loss in laterals and in distributing ditches occurs, consequently it should

be clearly indicated whether the amount of water entering a given canal through its headgate, the amount reaching a given reservoir, the amount drawn from that reservoir, the amount flowing through an outlet canal, the amount at the head of a lateral, or the amount actually distributed to the growing crops, is meant.

It will vary with the different kind of crops; alfalfa requiring for an entire season more than grain or potatoes. It will also vary with the aridity of the region, humidity of the atmosphere, amount of rainfall, cloudy weather, and other climatic conditions, and particularly with the individual user.

3. As is shown by careful experiments made at various agricultural colleges, such as Fort Collins, Colo.; Provo, Utah; and Laramie, Wyo., results varying from fair to excellent for such crops as alfalfa, potatoes, sugar beets, small fruits, grains, etc., are obtained by duties of water from .75 of an acre-foot per acre up to 3 or more acre-feet per acre.

FOREST FIRES OF 1910 AND THEIR CAUSES.

By L. N. JESUNOFSKY.

The burning of large areas of forests in the Southwest during April, May, and June, and in the Northwest and the upper Missouri and upper Mississippi valleys during July and August of the present year, whereby many lives were lost and great damage to timber resulted, has occasioned much discussion upon the methods of protection from forest fires. The principal agency attributable as the cause of these forest fires was the great deficiency in rainfall over nearly the entire western country, beginning early in the spring and continuing throughout the summer months. The averages of the accumulated departures in precipitation over the upper Mississippi Valley during consecutive monthly periods, from March 1 to August 29, 1910, as deduced from the National Weekly Weather Bulletin, were as follows: From March 1 to April 25, −2.4 inches; to May 30, −3.8 inches; to June 27, − 6.6 inches; to July 25, − 7.6 inches; to August 29, − 9.5 inches.

For the upper Missouri Valley, for the same periods, the averages of the accumulated departures were: From March 1 to April 25, − 1.3 inch; to May 30, − 2.7 inches; to June 27, −4.5 inches; to July 25, −5.9 inches; to August 29, −7.4 inches.

For the Rocky Mountain region, during the same period, the averages of the accumulated departures were: From March 1 to April 25, −0.9 inch; to May 30, −1.5 inch; to June 27, −2.1 inches; to July 25, −2.6 inches; to August 29, −3.1 inches.

For the Southwest, during the same period, the averages of the accumulated departures were: From March 1 to April 25, −0.1 inch; to May 30, −0.7 inch; to June 27, −0.9 inch; to July 25, −1.2 inch; to August 29, −1.2 inch.

It is a significant fact that no loss of life occurred in the forest fires of Arizona and New Mexico during the past spring and summer, a condition, due in part, however, to the less density of population in those Territories as compared with other sections where such fires occurred.